AMENDMENTS TO THE CLAIMS

1. (currently amended) A system comprising:

a gain medium which emits light;

a diffraction grating spaced apart from the gain medium; and

a retroreflector located to reflect light incident on the diffraction grating,

where a distance between the gain medium and the diffraction grating is adjustable along an axis parallel to a direction of the light emitted by the gain medium.

2. (original) The system of claim 1, wherein the gain medium comprises a laser diode with an antireflective coating.

3. (currently amended) The system of claim 1, further comprising an actuator coupled to adjust~~, the actuator being capable of adjusting~~ the distance between the gain medium and the diffraction grating.

4. (original) The system of claim 3, wherein the actuator comprises a piezoelectric actuator.

5. (original) The system of claim 3, wherein the actuator comprises a voice coil actuator.

6. (original) The system of claim 3, wherein the actuator is coupled to the gain medium.

7. (original) The system of claim 3, wherein the actuator is coupled to the diffraction grating.

8. (currently amended) The system of claim 3, further comprising a detector~~, the detector being capable of measuring~~ located to measure one or more wavelengths of the light ~~being~~ emitted from the gain medium, where a signal ~~information~~ from the detector is ~~used in~~ coupled to a closed loop feedback system to control the distance between the gain medium and the diffraction grating.

9. (currently amended) The system of claim 8, wherein the detector measures ~~is capable of measuring~~ phase of the emitted light ~~being emitted from the system~~.

10. (currently amended) The system of claim 3, further comprising a detector~~, the detector being capable of measuring~~ located to measure directionality of the light ~~being~~ emitted from the gain medium, where a signal ~~information~~ from the detector is coupled to ~~used in~~ a closed loop feedback system to control the distance between the gain medium and the diffraction grating.

11. (original) The system of claim 10, wherein the detector comprises a quadrant cell photodetector.

12. (currently amended) The system of claim 10, further comprising a pick off located between the gain medium and diffraction grating.

13. (currently amended) The system of claim 1, further comprising ~~a retroreflector actuator, the retroreflector~~ an actuator coupled to the retroreflector, to rotate ~~the retroreflector actuator being capable of rotating~~ the retroreflector relative to the diffraction grating.

14. (currently amended) The system of claim 13, wherein rotation of the retroreflector is centered about a ~~retroreflector pivot, the~~ pivot ~~being~~ positioned such that a cavity length of the system changes as the retroreflector rotates.

15. (currently amended) The system of claim 13, wherein rotation of the retroreflector is centered about a ~~retroreflector pivot, the~~ pivot ~~being~~ positioned such that a cavity length of the system does not change as the retroreflector rotates.

16. (currently amended) The system of claim 13, further comprising an encoder coupled to measure~~, the encoder measuring~~ a position of the retroreflector actuator.

17. (currently amended) The system of claim 16, wherein a signal ~~information~~ from the encoder is coupled to ~~used in~~ a closed loop feedback system to control the position of the retroreflector actuator.

18. (currently amended) The system of claim 16, wherein a signal ~~information~~ from the encoder is calibrated with respect to the distance between the gain medium and the diffraction grating.

19. (currently amended) The system of claim 18, wherein a signal ~~information~~ from the encoder is used to control the distance between the gain medium and the diffraction grating.

20. (currently amended) The system of claim 13, wherein the ~~retroreflector~~ actuator comprises a voice coil actuator.

21. (original) The system of claim 20, wherein the voice coil actuator comprises a rotary voice coil actuator.

22. (original) The system of claim 20, wherein the voice coil actuator comprises a toroidal coil rotary voice coil actuator.

23. (currently amended) A method of controlling light output from a tunable external cavity laser comprising:

providing a gain medium emitting light onto a diffraction grating, and a retroreflector to reflect light from the diffraction grating;

rotating ~~a~~ the retroreflector relative to ~~a~~ the diffraction grating to select a wavelength of light to amplify in ~~a~~ the gain medium; and

adjusting a distance between the gain medium and the diffraction grating to control a cavity length of the laser.

24. (currently amended) The method of claim 23, wherein rotating the retroreflector is accomplished by ~~a retroreflector~~ an actuator.

25. (currently amended) The method of claim 24, wherein the ~~retroreflector~~ actuator comprises a voice coil actuator.

26. (currently amended) The method of claim 23, wherein adjusting the distance between the gain medium and the diffraction grating is accomplished by ~~a cavity length~~ an actuator.

27. (currently amended) The method of claim 26, wherein the ~~cavity length~~ actuator comprises a piezoelectric actuator.

28. (currently amended) The method of claim 26, wherein the ~~cavity length~~ actuator comprises a voice coil actuator.

29. (currently amended) The method of claim 26, wherein the ~~cavity length~~ actuator is coupled to the gain medium.

30. (currently amended) The method of claim 26, wherein the ~~cavity length~~ actuator is coupled to the diffraction grating.

31. (currently amended) The method of claim 23, wherein a closed loop feedback system controls rotation of the retroreflector.

32. (currently amended) The method of claim 23, wherein a closed loop feedback system controls a cavity length of the laser.

33. (currently amended) A tunable external cavity laser comprising:

a gain medium, ~~the gain medium~~ comprising a laser diode with an antireflective coating;

a diffraction grating spaced apart from the gain medium;

a piezoelectric cavity length actuator~~, the cavity length actuator being capable of~~ adjusting a distance between the gain medium and the diffraction grating along an axis parallel to a direction of light emitted by the gain medium, the cavity length actuator coupled to the diffraction grating;

a retroreflector located to reflect the light incident on the diffraction grating;

a voice coil actuator~~, the voice coil actuator~~ coupled to the retroreflector~~, the voice coil actuator being capable of~~ and rotating the retroreflector relative to the diffraction grating;

an encoder~~, the encoder~~ measuring a position of the voice coil actuator, where a signal ~~information~~ from the encoder is coupled to ~~used in~~ a first closed loop feedback system to control the position of the retroreflector; and

a detector~~, the detector being capable of~~ measuring directionality of light ~~being~~ emitted from the gain medium, where ~~information~~ a signal from the detector is ~~used in~~ coupled to a second closed loop feedback system to control the distance between the gain medium and the diffraction grating.

34. (withdrawn) A method of calibrating a tunable external cavity laser comprising:

measuring light output from the tunable external cavity laser with a detector, the detector being capable of measuring one or more wavelengths of light;

calibrating a range of motion for a retroreflector actuator of the tunable external cavity laser based on the measured light output; and

calibrating a cavity length actuator of the tunable external cavity laser with respect to a position of the retroreflector actuator based on the measured light output.

35. (withdrawn) The method of claim 34, wherein the detector is capable of measuring phase of light.

36. (withdrawn) The method of claim 34, wherein calibrating a range of motion for a retroreflector actuator comprises:

sweeping the retroreflector actuator through its range of motion;

measuring a light wavelength at each position of the retroreflector actuator; and

storing a retroreflector actuator position for each wavelength measured.